a micro-lens **910** and an optical filter **920**. The micro-lens concentrates a light. The optical filter **920** passes a specific frequency band of the light, which is concentrated by the micro-lens.

The light having the specific frequency band which is passed through the optical filter **920** is detected by the photodiode **221** included in the image sensor module **220** of the element stacked unit **200**, and a detected light signal is converted into an electric signal.

Meanwhile in accordance with another aspect of the present invention, the backlight image sensor chip having the improved chip driving performance may further include a handling substrate **930**. The handling substrate **930** is formed on the front side of the element stacked unit, and prevents the element stacked unit **200** from being damaged.

Meanwhile, a metal shield **940** shown in FIG. **3** electrically and thermally shields a pad region A in which the conductive pad **400** is formed and a sensing region B in which the optical filter **920** is formed.

FIG. **4** is a flow chart illustrating a manufacturing process of a backlight image sensor chip having an improved chip driving performance in accordance with an embodiment of the present invention. A plurality of backlight image sensor chips having the improved chip driving performance may be manufactured in a wafer.

Firstly, in a first process, the handling substrate **930** is bonded to a front side of the element stacked unit **200**. Herein, the first process is performed in a state that the element stacked unit **200** is implemented to include the semiconductor circuit module **210** including the peripheral circuit **211** and the metal distribution line **212**, an image sensor module **220** including the photodiode **221** and the metal distribution line **222**, and the interlayer insulation layer **230** for an electrical insulation from the semiconductor substrate **100**.

Moreover, the first process may be performed in the state that the auxiliary driving unit **700** is included in the element stacked unit **200**, and in the state that the first coupling unit **510**, which is electrically coupled to the peripheral circuit **211** and the metal distribution line **212** of the semiconductor circuit module **210**, and the first auxiliary coupling unit **810**, which is electrically coupled to the auxiliary driving unit **700**, are implemented.

Next, in a second process, a back side thinning of the semiconductor substrate **100** is performed on the back side of the element stacked unit **200**. Herein, the back side thinning of the semiconductor substrate **100** may be performed on the back side of the element stacked unit **200** by depositing a silicon having the thickness of 2-6 μm on the back side of the element stacked unit **200**.

Subsequently, in a third process, the insulation multi-layer **300** is formed on the back side of the semiconductor substrate **100**. Herein, the insulation multi-layer **300** may be formed on the back side of the semiconductor substrate **100** by forming the anti-reflection layer **310** through the deposition of Oxynitride or Oxide-Nit-Oxide within the thickness of 500 Å on the back side of the semiconductor substrate **100**, by depositing the PDM dielectric layer **320** to have the thickness of 1000 Å to 5000 Å on the back side of the anti-reflection layer, and by forming the insulation layer **330** through the deposition of the oxide series material on the back side of the PDM dielectric layer **320**.

Next, in a fourth process, the coupling unit **500** and the auxiliary coupling unit **800** are formed. Herein, the coupling unit **500** and the auxiliary coupling unit **8000** may be formed by punching-through a hole for forming of the second coupling unit **500** and the second auxiliary coupling unit **820** through the etching of a portion of the insulation multi-layer **300**, and by electrically coupling the first coupling unit **510** and the first auxiliary coupling unit **810** through the second coupling unit **520** and the second auxiliary coupling unit **820**, which are formed by burying the tungsten (W).

Subsequently, in a fifth process, the conductive pad **400** and the routing metal **600** are formed on the portion of the back side of the insulation multi-layer **300**.

Then, in a sixth process, the dielectric layer **900** is deposited on the back side of the insulation multi-layer **300** on which the conductive pad **400** and the routing metal **600** are formed. Herein, the dielectric layer **900** may be formed by forming the pad open region through the pad open process after the dielectric material of oxide or nitride series is deposited on the back side of the insulation multi-layer **300** such that the conductive pad **400** and the routing metal **600** are buried.

Differently from this, the dielectric layer **900** may be formed by performing the planarization process after the dielectric material of oxide or nitride series is deposited on the back side of the insulation multi-layer **300** such that the conductive pad **400** and the routing metal **600** are buried.

through these implementations, the purpose of the present invention may be accomplished by improving the chip driving performance since an additional function such as an auxiliary power supply, an auxiliary signal transmission and an auxiliary operation control is performed in a backlight image sensor chip having a restricted area without an additional process by using a region, which excludes a pad region in which a conductive pad of a backlight image sensor chip is formed and the sensing region in which the optical filter is formed, as an auxiliary driving region.

Although various embodiments have been described for illustrative purposes, it will be apparent to those skilled in the art that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the following claims.

What is claimed is:

1. A backlight image sensor having improved chip driving performance, which includes an element stacked unit having a semiconductor substrate, a semiconductor circuit module formed on a front side of the semiconductor substrate, an image sensor module and an interlayer insulation layer, an insulation multi-layer formed on a back side of the semiconductor substrate, a conductive pad formed on a portion of the back side of the insulation multi-layer, and a coupling unit electrically coupled between the conductive pad and the semiconductor circuit module of the element stacked unit, comprising:

at least one routing metal formed in a region of a same layer as the conductive pad, and being electrically coupled to and directly contacting the conductive pad;

at least one auxiliary driving unit formed in the element stacked unit or the insulation multi-layer; and

an auxiliary coupling unit being electrically coupled between the at least one routing metal and the at least one auxiliary driving unit.

2. The backlight image sensor having improved chip driving performance of claim **1**, wherein the at least one auxiliary driving unit is at least one auxiliary power line for an auxiliary power supply.

3. The backlight image sensor having improved chip driving performance of claim **1**, wherein the at least one auxiliary driving unit is at least one auxiliary signal transmission line for auxiliary signal transmission.

4. The backlight image sensor having improved chip driving performance of claim **1**, wherein the at least one